

**STATEMENT OF WORK
FOR THE
ACOUSTIC HAILING DEVICE (AHD)**



**CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
MICROWAVE SYSTEMS DIRECTORATE
NIGHT VISION AND CHEM/BIO SENSORS**

STATEMENT OF WORK FOR THE ACOUSTIC HALING DEVICE (A HD)

1.0 SCOPE. This Statement of Work (SOW) describes the work tasks necessary to produce an **Acoustic Hailing Device (AHD)** System meeting the requirements of the Integrate Radar Optical Surveillance and Sighting Sytem (IROS3). This SOW provides for the procurement, manufacturing, test, system spares, repair and technical documentation for the **AHD**. **This SOW and performance specification embrace and incorporate Performance Based Logistics practices/methods to be used in the manufacture of the item and execution of the Integrated Logistics Support Program.** The **AHD** will be installed and operated on military maritime crafts and exposed to harsh operating and environmental conditions.

2.0 LISTING OF APPLICABLE DOCUMENTS. The following specifications and documents form a part of this SOW to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto.

2.1 Performance Specification.

Performance Specification for **AHD**

2.2 Military Handbooks.

MIL-HDBK-61A	Configuration Management, Feb 2001
MIL-PRF-49506	Logistics Management Information, Nov 1996
MIL-HDBK-2036	Preparation of Electronic Equipment Specification 1 Nov 1999
MIL-HDBK-46855A	Human Engineering Requirements for Military Systems, Equipment and Facilities 17 May 1999
MIL-STD-2525B	Common War Fighting Symbolology 30 Jan 1999
MIL-DTL-38999K	Connectors, Electrical, Circular, Miniature, High Density, Quick Disconnect (Bayonet, Threaded, and Breech Coupling), Environment Resistant, Removable Crimp and Hermetic Solder Contacts, General Specification 12 Jul 2002
MIL-DTL-5015H	Connectors, Electrical, Circular Threaded, AN Type, general Specification 18 May 2000
MIL-C-24643B	Cable and Cords, Electric, Low Smoke, for Shipboard Use, General Specification 22 Aug 2002
MIL-STD-2042B	Fiber optic Cable Topology Installation Standard Methods for Naval Ships 28 Jul 2002
MIL-C-28876D	Connectors Fiber Optic, Circular, Plug and Receptacle Style Multiple Removable Termini, General Specification 04 May 1995
MIL-PRF-85045F	Cables, Fiber Optics (Metric), General Specification 12 Aug 1999
MIL-A-8625F	Anodic Coatings for Aluminum and Aluminum Alloys 10 SEP 1993
MIL-STD-810F	Department of Defense Test Method Standard for Environmental Engineering Considerations and Laboratory Tests 30 Aug 2002
MIL-STD167/1	Mechanical Vibrations of Shipboard Equipment (Type-1 Environmental and Type II – Internally Excited) 19 Jun 1987
MIL-S-901D	Shock Tests H.I. (High Impact) Shipboard Machinery, Equipment, and Systems, Requirements For 17 Mar 1989
MIL-STD-461E	Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment 20 Aug 1999
MIL-STD-882D	Standard Practice for System Safety 10 Feb 2000
MIL-STD-1399-300A	Interface Standard for Shipboard Systems Section 300A Electric Power, Alternating Current (Metric) 11 Mar 1992

2.3 Other Publications.

ANSI/ASQC	Quality Systems – Model for Quality Assurance in Design
Q9001	Development, Production, Installation, and Servicing, 1994
46 CFR Part 111	Electric Systems – General Requirements,
FED–STD-595B	Colors Used in Government Procurement 11 Jan 1994
DOD-STD-1399/70-1	Interface Standard for Shipboard Systems Section 070 –Part 1
	D.C. Magnetic Field Environment (Metric) 30 Nov 1989
OPNAVINST 3000.12	Operational Availability Handbook 30 Sep 1999
CONFIDENTIAL/NO FORN	Radar Cross Section (RCS) Requirements for Integrated Radar
	Optical Surveillance and Sighting System (IROS ³) Dec 2002

2.4 ORDER OF PRECEDENCE. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document supersedes applicable Federal, State or Local Laws and regulations unless a specific exemption has been obtained.

2.5 AVAILABILITY OF DOD DOCUMENTS. Government standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094. The Performance Specification is available from NSWC Crane.

3.0 REQUIREMENTS. The Contractor shall provide the **AHD** in accordance with this SOW and the performance requirements contained in the **AHD** Performance Specification, referred herein as Performance Specification. The AHD shall have the following capability: rugged, marinized, to deter asymmetric threats for a shipboard application. It shall allow functions such as control of light direction and slewing, beam field of view adjustments, visual detection of surface threats at night and in conditions of reduced visibility. The Contractor shall perform the following tasks to support production of a **AHD**, which meet all the requirements of performance specification. The acceptance testing performed does not relieve the Contractor of its responsibility for full compliance with all requirements of performance specification. Ancillary equipment as an objective shall not be required. As a threshold, ancillary equipment is permissible to support searchlight unit (19" rack mountable equipment, bulkhead mountable ancillary equipment). Less ancillary equipment shall have preference over more ancillary equipment.

The AHD delivered under this contract must be capable of meeting all requirements of the Performance Specification. This includes product sample tests, acceptance tests and quality surveillance tests.

The Contractor shall provide a certificate of conformance that the **AHD** System delivered meets the Contract requirements cited herein and the Contractors Proposal and shall be provided with each delivered **AHD** System. The Contractor shall have an integrated support process that includes having all management, administration, and product description data available digitally on optical media (i.e. CD-ROM). The Government will conduct a Post Award Conference within 30 days after contract award at a mutually agreeable time.

3.1 CONFIGURATION MANAGEMENT.

3.1.1 Configuration Management Program. The Contractor shall have an established, Government verifiable, Configuration Management Program with control systems in place for the complete AHD including configuration identification of each hardware and software configuration item for the Contract Life. The Contractor shall control the Product

Baseline (PBL) using their change control and engineering release processes. The PBL shall support interchangeability and interoperability to the replaceable part level. All baselines shall be documented in the Contractor's configuration status accounting database. The contractor shall maintain a configuration management (CM) program, inclusive of all hardware and software, consisting of the following elements:

- a. Configuration Identification
- b. Configuration Control
- c. Configuration Status Accounting
- d. Configuration Audits

3.1.2 Configuration Identification Baseline. The Contractor shall establish the Product Baseline (PBL) and Build of Materials (BOM) at the time of contract award. It is the Government's intention to take delivery of the Contractor's complete PBL and BOM documentation at the end of this contract, after verifying its accuracy. **(CDRL A001).**

The product baseline shall be established by:

- a. Configuration Item Specification
- b. Outline Drawings
- c. Bill of Materials
- d. Engineering Drawing Tree Flowchart

All drawings shall at a minimum be in AutoCad 2002. The Government shall have limited data rights to include the ability to reproduce this data for internal Government purposes only.

3.1.3 Configuration Control. Only an approved Engineering Change Proposal (ECP) shall change designated product baseline documents. **(CDRL A002)**

3.1.3.1 Engineering Change Proposal. The Contractor shall implement and control changes to the PBL and BOM via the Engineering Change Proposal (ECP) Process for Contractor and Government recommended and Government approved changes. The Contractor shall submit for approval by the Government, Class I ECPs, Request for Deviations, Request for Waivers and Notice of Revisions for those proposed changes affecting (as a minimum) form, fit, function, reliability, cost and maintainability for both hardware and software. The Contractor shall provide engineering change proposals via electronic mail and hard copy. Preparation of ECP's shall be IAW MIL-HDBK-61 for submission. **(CDRL A002, A003, A004, A005).**

3.1.3.1.1 Class I ECP's. Class I ECPs shall be defined as any change to the configuration item's specification or outline drawing, which affects form, fit, or function. All Class I ECP's shall be tracked to LRU serial number effectivity.

3.1.3.1.2 Class II ECP's. Class II ECP's shall be defined as any, which does not meet the definition of a Class I ECP. Class II ECP's shall be further categorized as tracked or non-tracked. Any ECP to a piece part, subassembly or assembly which changes the design, material, process, or lessons tolerances shall be categorized as tracked. Class II tracked ECP's shall be tracked to serial number effectivity. If an ECP has no potential impact on life or performance, that ECP shall be categorized as non-tracked. The Government shall review each Class II ECP and be notified of a proposed ECP 45 calendar days prior to execution.

3.1.4 Configuration Status Accounting. The contractor shall maintain a configuration status accounting system that identifies the status of changes to the baseline and the status of implementation of approved changes.

3.1.4.1 Serialization. Sequential serial number, in ascending order, shall be assigned and permanently attached in a clearly visible place to each deliverable meeting the requirements of this contract. The contractor shall utilize Unique Identification standards.

3.1.4.2 Replacement Assets. If a serialized asset is replaced, the replacement shall have a new serial number. Documentation shall include the serial number of the asset being replaced along with the new replacement serial number.

If an asset is replaced under a warranty provision of the contract, the replacement asset shall be subject to the remainder of the warranty period, which began with the original asset. Additionally, an asset returned under a warranty provision may be repaired and be resubmitted for acceptance in accordance with the contract.

3.1.5 INTEGRATED LOGISTICS SUPPORT (ILS)

3.1.5.1 Logistics Systems Engineering. The Contractor shall implement a Logistics Systems Engineering Program to fully support the AHD for its operating life. The contractor shall incorporate and implement Performance Based Logistics into the Logistics Systems Engineering Program. The contractor shall implement continuous modernization by insertion of state-of-the-art technologies into the items and spares being manufactured and supported in order to achieve Government goals of increasing performance availability, improving reliability and mitigating obsolescence issues. These efforts shall support additional goals of the Government's by lowering sustainment costs while increasing the capability of the unit to meet evolving Warfighter requirements throughout the product's service life. The Contractor shall establish an Integrated Support Plan to ensure that supportability requirements are consistent with the requirements contained in this Contract. The Contractor shall provide ILS in the most cost effective manner possible utilizing existing ILS documentation and resources to the maximum extent possible.

3.1.5.2 Data Validation. The Contractor shall have a process in place that provides for the validation of the adequacy and technical accuracy of the ILS documentation for the AHD. The Government will verify and approve the accuracy of all ILS documentation provided by the Contractor. The Contractor at no additional expense to the Government shall correct any discrepancies in the ILS documentation. All ILS documentation shall be kept current for the AHD contract life.

3.1.5.3 Repair Turnaround Time. The Contractor shall possess sufficient resources, procure and maintain an adequate supply of Lowest Replaceable Units (LRU) to respond to a service turnaround of ten (10) calendar days upon receipt of LRU.

3.1.5.4 Maintenance Planning. The AHD System shall be maintained under a two level concept, Organizational (O) to Depot (D), as defined in MIL-PRF-49506.

3.1.5.5 End of Life Considerations. The contractor shall prepare and submit to the Government via electronic media a report which documents any material(s) in the item that require special attention prior to disposal of items at the end of their life. Examples of such materials are precious metals, hazardous materials or carcinogens. This report shall be submitted one time with the delivery of (CDRL A001) in contractor format.

3.2 QUALITY PROGRAM. The Contractor shall have a quality system that ensures conformance to contractual requirements and meets the requirements of ISO 9001, or an equivalent quality system model.

3.2.1 Quality Audits of Contractors. The Government reserves the right to perform quality audits to verify the contractor's compliance with the established quality program. The government shall notify the contractor five (5) working days prior to conducting of an audit. Such audits may consist of, but not be limited to, evaluation of records, processes and product. The contractor shall be notified in writing of deficiencies found during these audits and shall be given a mutually agreed period of time to correct noted deficiencies. Failure to correct quality deficiencies may result in withholding of acceptance of the contract end item.

3.3 RELIABILITY/MAINTAINABILITY.

3.3.1 Field Failure Summary Analysis and Corrective Action Reporting. The Contractor shall have an established closed loop failure reporting system, procedures for analysis of failures to determine cause, and documentation for recording corrective action taken. The Contractor shall have a mechanism for feedback of field product performance, problems, failures, and shall implement an effective cause and corrective action system. The Contractor's existing data collection, analysis, reporting and corrective action system shall be used for field failure reporting. Failure data shall be isolated to the lowest replaceable unit (LRU). The Field Failure Reporting and Corrective Action System shall identify failures, prioritize failure trends, analyze failure modes and causes and track solution effectiveness. The Contractor shall provide a monthly Failure Summary Analysis Report for each AHD LRU repaired or replaced under warranty service and shall be included as part of the Monthly Progress Report. (CDRL A006).

3.3.2 Performance. The Contractor shall notify the Government immediately after identification of any and all performance related data that would both positively and negatively impact the reliability, maintainability, availability, and/or supportability of the AHD. The Government may test, validate, verify, and/or certify any and all of the AHD's performance parameters to verify compliance with the Contract.

3.3.3 Reliability Centered Maintenance. The contractor shall generate a Reliability Centered Maintenance Analysis on components at the LRU and submit the data to the Government. (CDRL A007)

3.3.4 Reliability Data. The contractor shall collect reliability data on components at the LRU and submit the data to the Government. (CDRL A008)

3.4 WARRANTY RETURNS. All assets returned under the warranty provisions of this contract shall be subject to failure analysis by the contractor at the contractor's expense. All assets returned under warranty shall be tested in accordance with the same tests used for acceptance. The contractor shall execute all warranty repairs within ten (10) calendar days of the item being received by the contractor.

3.5 NON-WARRANTY RETURNS. The contractor shall implement a repair program for non-warranty repairs. Upon receipt of items from the Government, estimates of repairs shall be created and submitted to the Government at no cost to the Government. Repair prices will be negotiated individually and documented on specific delivery orders for each repair. Delivery of repaired non-warranty items shall not exceed ten (10) calendar days.

3.6 INSPECTION AND ACCEPTANCE. The Contractor shall generate and submit a Contractor's Acceptance Test Plan via electronic media for review and approval by the Government. (CDRL A009). The contractor shall also be responsible for documenting the acceptance test procedure utilized for this item via electronic media for review and approval by the Government (CDRL A010).

3.6.1 Testing. The Contractor shall make available for Government's review, all previous and current test results concerning the performance, reliability, maintainability, availability, environmental conditions, shock, vibration, electromagnetic interference (EMI) emission and susceptibility and safety on the AHD System (Refer to Specification Appendix "B"). The Contractor shall provide a Certificate of Conformance stating the above testing is in full compliance with the standards referenced in this Contract.

3.7 TRAINING AND TRAINING SUPPORT (PRODUCTION).

3.7.1 Course Curriculum Training Materials. The Contractor shall provide a training support package that will provide operator and maintenance training to support "Train the Trainer/Train the Maintainer" type of New Equipment Training. The training support package shall consist of a Student and Instructor Trainee Guide, Course Objectives with Lesson Plans, Test Package, Program of Instruction including Training Course Schedule and syllabus, and other training aids for a maximum of 20 students and provide on a CD-ROM. (CDRL A011). All training shall be provided by the Contractor, utilizing a fully operational AHD at the Government's Facility utilizing Contractor assets. If the Contractor requires the use of a Government owned asset, they shall notify the Government within 30 days prior to conducting the training. The Contractor shall identify any technical training equipment required to support AHD training and provide any identified materials to the Government via electronic media.

3.7.2 Operator Course. The Operator training shall be provided and comprised of those functions that the equipment user is required to perform in order to operate and maintain the AHD. The training instructions shall include theory of operations, operation, skill development and practical applications required to set up, check out, operate all equipment and run diagnostics. The course shall support all operator tasks.

3.7.3 Maintenance Course. The Maintenance course shall be provided and include the O and D level maintenance concepts, the use of support equipment, troubleshooting techniques, LRU removal and replacement, adjustments, Built-In-Test/Fault Isolation Test (BIT/FIT), and performance verifications. The training course shall be set up to indoctrinate the students to become proficient in operation, installation/removal procedures, maintenance and repair to the level of training other students (train-the-trainer).

3.7.4 Training Materials. Training aids for presentation shall be a form suitable for overhead projections (powerpoint), whiteboard presentations, drawings and/or CD-ROM. An Operator and Maintenance Technical Manual shall be provided to each student. A certificate of training shall be completed by the Contractor and provided to each student who satisfactorily completes a Contractor's training course. The Contractor shall grant the Government the authority to reproduce, update, or change the data contained in the Training Curriculum and Training Materials. All Training Materials shall duplicate as much as necessary those items that will be used in the real operational environment.

3.8 TECHNICAL DATA.

3.8.1 Technical Manuals. The Contractor shall provide a Technical Manual to reflect complete operation and maintenance for the AHD. The Contractor shall periodically incorporate all approved changes to the PBL into the technical manuals for the life of the contract. The Contractor shall provide an Illustrated

Parts Breakdown (IPB) with tabulated parts information in the Technical Manual to support the ability to order repair items and consumables as defined in the maintenance chapters. The Interface Control Drawings shall be included in the Technical Manual. Physical delivery shall be by hard copy and CD-ROM in Microsoft Word/Excel/Powerpoint with viewer software (CDRL A012).

3.8.2 Technical Manual Validation/Verification. The Contractor shall validate the completeness and technical accuracy of the technical manual by applying the following steps:

- a. Performing each procedure.
- b. Performing a desktop validation of all non-procedure text and graphics.
- c. Supply validated copies of the Technical Manual to the Government.
- d. Provide a certificate of validation certifying accuracy.
- e. Coordinate a verification meeting with the Government to complete validation / verification of technical manual.

The Government will perform a verification to ensure the accuracy and completeness of the technical manuals. Upon completion of the verification effort, the Contractor shall incorporate all verification changes at no additional cost to the Government.

3.8.3 System Drawings. The Contractor shall provide level II System Drawings as part of the PBL (CDRL A001) that will include drawings that clearly show the LRUs, cable assemblies and interconnects, and installation components. The level II System Drawings shall clearly denote mechanical and electrical footprint of the system.

The contractor shall provide level III shipboard system cable drawings. The shipboard system cable drawings shall clearly show, at a minimum, the complete cable assembly, connectors, back-shells, wiring diagram (pin-out), and other pertinent data required for cable assembly to include part numbers and vendor information. The drawings shall include tables that clearly describe in full detail all cable signal functions and descriptions and connector information that will aid the Government to troubleshoot the system.

The Government shall have limited data rights to include the ability to reproduce the level II data drawings for internal Government purposes only. The Government shall have unlimited data rights for the level III data drawings. All drawings shall be in AutoCad 2002 or newer.

3.8.4 Interface Control Documentation. The contractor shall define and document the interface parameters between co-functioning system segments relative to all software control functions (CDRL A013)

3.9 SUPPLY SUPPORT.

3.9.1 Provisioning Technical Documentation. The Contractor shall develop and provide provisioning technical documentation of spare, repair and consumable items from the Original Equipment Manufacturer (OEM) and Vendors/Subvendors with top down breakdown drawings (i.e. PBL and BOM). The Contractor shall prepare Provisioning data for all LRUs, equipment, and related engineering design changes. The Contractor shall develop and provide Provisioning data for any nonstandard equipment or assembly obtained from any

source of supply unable to furnish Provisioning data, and any equipment or assembly which the Contractor. The Contractor shall ensure that this data is kept current for the life of the contract.

In order for the Government to establish items of support and to determine repair parts, certain data describing the relevant characteristics of the items are required. The data elements for provisioning are as follows: (1) Source (CAGE Number); (2) Part Number (Contractor/OEM); (3) Item Name/nomenclature (Descriptive Name); (4) National Stock Number (if applicable); (5) Unit of Issue; (6) Unit of Issue Price; (7) Quantity per assembly; (8) Mean Time To Repair (MTTR); (9) Mean Time Between Failures (MTBF); (10) Mean Time Between Mission Critical Failure; (11) Reliability and (12) Shelf Life.

As part of the provisioning technical documentation, the Contractor shall provide a complete listing of all the parts that identifies the end item that can be removed and replaced at the O level and repaired at D Level. The Master Materials Parts List (i.e. BOM) shall be delivered in a top-down breakdown format of the end item(s) and shall include repairable, replacement parts (consumables) and long lead-time items (LLTI). The Master Materials Parts List shall include spare and repair parts for any associated support equipment required to support and maintain the System. The Contractor shall identify which items are repairable, consumables, LLTI, common bulk items, and support equipment spare and repair parts each item on the list shall be priced and available for ordering. All Common and bulk items such as gaskets, fuses, or similar items shall be identified to the equipment level. The Master Materials Parts List shall be developed based upon the approved PBL. The listing shall contain the part number, nomenclature, CAGE, quantity, and unit price. The Contractor shall validate the provisioning data and ensure the data is in accordance with the PBL and BOM and is traceable to the Technical Manual. **(CDRL A014).**

3.9.2 Recommended Spare Parts List for Spares Acquisition Integrated with Production (SAIP). The contractor shall employ the concept of concurrent release of spares orders with identical parts as installments on the production unit. The Contractor shall provide a recommended 90-day and a 12-month initial recommended spares list for both O and D level sustainment based upon initial quantities of **AHD** ordered and provide updates as the number of **AHD** changes. This shall include spares and repair parts for any associated support equipment. **(CDRL A015).**

3.9.3 PROGRAM SUPPORT. The contractor shall host and/or attend a production status review meeting quarterly for all Navy production and technical personnel, normally not to exceed one day. Format of the review meetings is not specified, but will function to a mutually agreed to agenda and list of attendees. Dates for these meetings shall be established by Naval Surface Warfare Center Crane Division (NSWCC) Crane, Indiana, Code 805C, a minimum of fourteen (14) calendar days in advance of the meeting date. For planning purposes, the contractor shall assume the meetings will alternate quarterly between NSWCC Crane, Indiana and the contractor's facility. The Contractor shall be prepared during all Production status review to address the contract performance at the total level and at lower level elements and performing organization levels. Contractor performance discussions shall include but not be limited to: schedule, technical performance, risk elements and assumptions, work around plans, anticipated problems, and estimates to complete remaining work. The Contractor shall prepare agenda and minutes for each meeting and provide via electronic access and electronic mail within seven days of the Production Status Reviews. **(CDRL A016, CDRL A017)**

3.9.4 Program Management. The Contractor shall develop and execute an innovative plan to manage the AHD Program. The Contractor shall be responsible for overall AHD performance and shall define and maintain appropriate subcontract and associate contract relationships to support all necessary requirements, allocations and interfaces. The Contractor shall designate a central point of contact for substantive communication with the Government.

3.9.5 Plan of Action & Milestones (POA&M). The Contractor shall develop, maintain, and use a POA&M. The POA&M shall include a description of the system engineering management and integrated logistic management approaches including all key personnel, processes and approaches. The POA&M shall provide the AHD Program with necessary information to monitor progress, identify significant problems, and implement corrective action as applicable. The contractor shall provide access to all records, data and plans for Government review. The Contractor shall provide the Government the Contractor's POA&M via electronic media of MS Project for Navy / Marine Corp Internet compliance.

3.9.6 Monthly Progress Reports. The Contractor shall submit monthly progress reports identifying detailed work and schedule status of on-going work, action items, and risk items. (CDRL A018).

3.10 PACKAGING, HANDLING, STORAGE AND TRANSPORTATION. The Contractor shall ensure that each AHD System is packaged in a commercially available ruggedized, reusable shipping container with easily securable latches and pull handle. The AHD shall be fully assembled and placed as compactly and efficiently as plausible to protect the equipment from damage during shipping and handling. The Contractor shall ensure these containers have multiple handles, foam inserts that do not absorb fresh or salt water and provisions for securing with a padlock. The Contractor shall ensure the AHD, when packed in its shipping container, will be protected from marine environments, shock and vibration and capable of being transported on standard transportation systems, by commercial or military carriers.

Each container shall have permanently affixed a Radio Frequency Identification Tag (RFID). The RFID shall be affixed to the exterior of each case. The RFID shall be passive, class 1. Refer to www.dodrfid.org.

3.11 FOREIGN MILITARY SALES (FMS)

In order to prevent unauthorized release regarding the AHD, the Contractor shall sign a non-disclosure statement with the Government agreeing not to share or release AHD specific technical data without express written concurrence by the Contracting Officer at NSWC Crane Division.

4.0